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One entry found for phosphorescence.

Main Entry: phos·pho·res·cence
Pronunciation: -'re-s&n(t)s
Function: *noun*
Date: 1796

1 : luminescence that is caused by the absorption of radiation at one wavelength followed by delayed reradiation at a different wavelength and that continues for a noticeable time after the incident radiation stops — compare FLUORESCENCE
2 : an enduring luminescence without sensible heat

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page 1 of our primer: The Vocabulary of Luminescence; page 2 is here

The phenomenon of the emission of light from various semiconductor materials under excitation is called *luminescence*; this is a low temperature process, and is not to be confused with incandescence, which is the emission of light by bodies at elevated temperatures. Materials which exhibit this property are called *phosphors*.

Luminescence may be divided into two kinds: *phosphorescence* and *fluorescence*.

Phosphorescent materials produce an emission of light which continues for a considerable time after the excitation has been withdrawn, up to several seconds or even minutes.

Fluorescence is like phosphorescence, but there is no afterglow; the emission process halts abruptly on removal of excitation.

To make the nomenclature completely descriptive, each type of luminescence may also be referred to by a name according to the method of excitation.

Using fluorescence as an example, we can have three kinds of that, as follows:

- *photofluorescence* (which occurs under the excitation of light (photons)),
- *cathodofluorescence* (which occurs under bombardment by electrons), and
- *electrofluorescence* (caused by the passage of an electric current through the specimen).

Phosphorescence can be produced by the same methods, so there are three names for varieties of that too, completing the list of the six types of luminescence used in electronic display technology:

Family Tree of Luminescence Types:			
Luminescence (emission of light)	Phosphorescence (strong afterglow)	Photophosphorescence	(excited by light)
		Cathodophosphorescence	(excited by electrons)
		Electrophosphorescence	(excited by current)
	Fluorescence (no afterglow)	Photofluorescence	(excited by light)
		Cathodofluorescence	(excited by electrons)
		Electrofluorescence	(excited by current)

Note: For some manifestations of luminescence, it is not necessary or desirable to attempt their classification into fluorescence or phosphorescence, and the terms *photoluminescence*, *cathodoluminescence* and *electroluminescence* may be used in these cases.

All these varieties of luminescence are the result of generation and recombination of electron-hole pairs in a semiconductor under excitation. In fluoresence, the average lifetime of electron-hole pairs is a small fraction of a microsecond, and this expains why the process does not linger on after stimulation ceases. Phosphorence continues because the electron-hole pairs exist for longer, due to a mechanism called trapping, in which an atom can be held in a metastable state.

Light of different colours can be produced from the same phosphor, by introducing *dopants* or *activators*. This enables the production of colour television cathode ray tubes, where three separate electron beams are aimed at a pattern of especially doped phosphor dots coated on the inside of the screen (more on p2).

There are other interesting forms of luminescence which we will only mention in passing: *triboluminescence* is produced by the action of friction or pressure on a suitable phosphor; *thermoluminescence* is produced in some materials by the action of heat; *chemiluminescence* is caused by inorganic chemical reactions; *bioluminescence* is from organic or biological chemical reactions; and *sonoluminescence* is generated by the influence of sound waves.

Ordinary fluorescent lamps are in fact photofluorescent, and ought really to be called photofluorescent lamps! A gas discharge within the tube generates ultra-violet light, which impinges on a fluorescent phosphor coating on the inside of the glass. The phosphor is then excited sufficiently to produce light within the visible spectrum.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report) -20-

Application number
GB 9322765.0

Relevant Technical Fields

(i) UK Cl (Ed.L) C3V (VACH)

(ii) Int Cl (Ed.5) C09D-5/22; C09D-5/32; C09K-11/00

Search Examiner
A J RUDGE

Date of completion of Search
10 FEB 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: WPI, WPIL, CLAIMS, EDOC

Documents considered relevant following a search in respect of Claims :-
ALL

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2017741 A	(SHAW AND NORTON) see whole document	1,2,5,6,8, 11,12,16
X	US 4707297	(BELL AND HOWELL) see whole document	1,2,5,6,8, 11,12,16
X	US 3867302	(SINLOIHI) eg Claim 1	1,2,5,6,8, 11,12,16
X	EP 0522785 A2	(PILKINGTON) see whole document	1,2,5,6,8, 11,12,16
X	EP 0040710 A1	(KOLLMER) eg Claim 3	1,2,5,6,8, 11,12,16

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Thermographic Phosphor Sensing Applications

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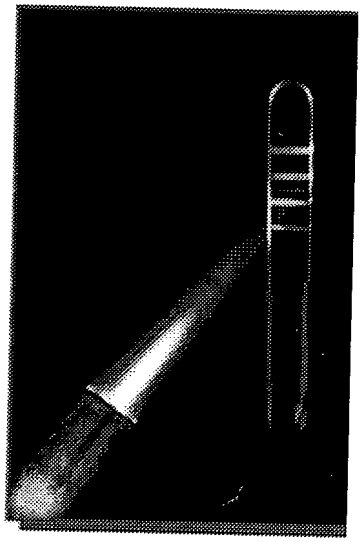
Phosphors

Phosphors are fine white powders which fluoresce when suitably excited. Many of them are ceramics and can withstand extremely high temperatures.

The fluorescence characteristics change with temperature and thus a phosphor coating may indicate the temperature of the surface onto which it is coated. Seen here is a tensile specimen coated with phosphor and illuminated with a black light so that the stripes of phosphor glow red.

There are a wide variety of ceramic phosphors which fit these characteristics:

- Survives hazardous chemical environments.
- Not water soluble.
- Durable.
- Easy to apply.



The white stripes of phosphor o metal specimen glow red illuminated by a black light. phosphors have no trouble sur and functioning in high tempera such as those produced by propane torch.

Continue

Background

The basic principle of thermal phosphors is well established, an researchers at ORNL have demonstrated several usefu applications [1-5]. The method relies on measuring the rate o decay of the fluorescent response of an inorganic phosphor as function of temperature. Having calibrated the phosphor over th temperature range of interest, a small surface deposit of phospho

is excited with a pulsed laser and the fluorescent decay measured (typically in less than 1 msec) to calculate th temperature of the substrate. In many instances, (e.g., in continuous steel galvanneal process) a simple puff of powder ont the surface provides an adequate fluorescent signal. Suitabl phosphors are available to cover temperature ranges from 8 K t 1400°C [1,6-7].

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One entry found for fluorescence.

Main Entry: fluo·res·cence
Pronunciation: -'re-s&n(t)s
Function: *noun*
Etymology: *fluor*spar + opal*escence*
Date: 1852
: luminescence that is caused by the absorption of radiation at one wavelength followed by nearly immediate reradiation usually at a different wavelength and that ceases almost at once when the incident radiation stops; *also* : the radiation emitted — compare PHOSPHORESCENCE